

**WHAT IS CLAIMED IS:**

1. A redundant apparatus for a GE-PON (Gigabit Ethernet Passive Optical Network) system which includes an OLT (Optical Line Terminal), a splitter connected to the OLT via a working path line composed of only one optical fiber, and a plurality of ONUs (Optical  
5 Network Units) connected to the splitter via individual optical fibers, said apparatus comprising:

said working path line located between the OLT and the splitter to perform two-way communication;

a redundant path line which is composed of only one optical fiber located between  
10 the OLT and the splitter to perform two-way communication;

ONU means for detecting a transmission loss of the working path line upon receiving a signal transmitted from the OLT to one ONU among the ONUs, and for transmitting switching information of the working path line via the working path line; and

an OLT for receiving the switching information via the working path line, and for  
15 transmitting data to the ONU means via the redundant path line according to the received switching information.

2. The apparatus of claim 1, wherein said working and redundant path lines are disposed in a 1+1 configuration.

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3. The apparatus of claim 1, wherein the splitter is a 2xN splitter.

4. An apparatus, comprising:

a 2xN splitter;

an OLT (Optical Line Terminal) being connected to the 2xN splitter via a first path line or a second path line, and including a switching unit for switching the first path line or  
5 the second path line upon receiving a predetermined control signal; and

an ONU (Optical Network Unit) for creating a switching request according to a signal environment, and transmitting the generated switching request to the OLT.

5. The apparatus of claim 4, wherein the apparatus comprises a passive optical  
10 network (PON).

6. The apparatus of claim 5, wherein the apparatus comprises a GE-PON (Gigabit Ethernet Passive Optical Network).

7. The apparatus of claim 4, wherein either one of the first path line and the second  
15 path line of the 2xN splitter is connected to the OLT and is adapted as a working path line, and the other one is not connected to the OLT and is adapted as a protection path line.

8. The apparatus of claim 7, wherein the splitter has a first input terminal and a second input terminal, and wherein the switching unit of the OLT disconnects the OLT from the splitter in switching the first input terminal to re-adapted the first input terminal  
20 from the working path line to the protection path line, or connects the OLT to the splitter in

switching the second input terminal to re-adapt the second input terminal from the protection path line to the working path line.

9. The apparatus of claim 8, wherein the switching unit of the OLT disconnects the OLT from the splitter in switching the second path line having been adapted as the working path line to the protection path line, or connects the OLT to the splitter in switching the first path line having been adapted as the protection path line to the working path line.

10. The apparatus of claim 9, wherein the apparatus comprises a GE-PON (Gigabit Ethernet Passive Optical Network).

11. The apparatus of claim 8, wherein the apparatus comprises a GE-PON (Gigabit Ethernet Passive Optical Network).

12. The apparatus of claim 7, wherein the apparatus comprises a GE-PON (Gigabit Ethernet Passive Optical Network).

13. The apparatus of claim 4, wherein said creating occurs in response to at least one of a signal degradation, a signal failure, and a power margin.

14. The apparatus of claim 13, wherein the apparatus comprises a GE-PON (Gigabit Ethernet Passive Optical Network).

15. An OAM (Operation, Administration and Maintenance) frame for a GE-PON (Gigabit Ethernet Passive Optical Network) system having two path lines located between a splitter and an OLT (Optical Line Terminal) in which only one path line is in a connection state to serve as a working path line, and the other one path line is in a no-connection state to serve as a protection path line, said OAM frame comprising:

data field having information generated by an ONU (Optical Network Unit) to request a switching operation between the working path line and the protection path line.

16. The OAM frame of claim 15, further comprising a flag field having an N-th bit that is adapted to perform an alarm function, wherein the N-th bit indicates the existence of a predetermined condition for requesting the switching operation.

17. The OAM frame of claim 16, further comprising an operation (OP) code for event notification, the OP code including a predetermined value indicating asynchronous information.

18. A method for controlling an apparatus including:

a 2xN splitter;

an OLT(Optical Line Terminal) being connected to the 2xN splitter via a first path line or a second path line and having a switching unit for switching the first path line or the

5 second path line upon receiving a predetermined control signal; and

an ONU (Optical Network Unit), said method comprising the steps of:

a) by means of the ONU, checking a signal environment;

b) by means of the ONU, to generating a switching request according to the checked result and transmitting a packet containing the switching request to the OLT;

10 c) by means of the OLT, receiving the packet and detecting the switching request;  
and

d) by means of the OLT and upon receiving the switching request, switching a current working path line to a protection path line and switching a current protection path line to the working path line.

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19. The method of claim 18, wherein the apparatus comprises a passive optical network (PON).

20. The method of claim 19, wherein the apparatus comprises a GE-PON (Gigabit  
20 Ethernet Passive Optical Network).